# Voice Disorders and Voice Knowledge in Choir Singers – Survey Findings

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Abstract for Master's Thesis

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The vocal mechanism is the most important instrument for singers. It could be assumed that singers care for their voices in order to sustain and improve their voice quality and function. Singers have reported higher prevalence of vocally harmful behaviors, vocal symptoms and voice disorders than non-singers. The purposes of this study were to investigate the prevalence of voice disorders among choir singers and to discover the risk factors associated with voice disorders. Another purpose was to explore the choir singers' knowledge about the voice anatomy, physiology and voice ergonomics.

The data was collected with a web-questionnaire sent out via e-mail through two choral associations in the Swedish-speaking part of Finland. A few choirs that were not part of any of these associations were also contacted personally. The questionnaire included demographic questions and questions about vocal symptoms, vocal habits and voice knowledge. 315 adult choir singers participated in the study, 65 % of whom were women, and 35 % men.

Of the choir singers, 21 % experienced two or more frequently occurring vocal symptoms, which could be defined as a functional voice disorder. No significant gender differences in the prevalence of vocal symptoms were found in this study. The most common vocal symptom was throat clearing or coughing, frequently occurring for 29 % of the choir singers. Choir singers with a vocally demanding profession were almost twice as likely to report several frequently occurring vocal symptoms. Health-related risk factors, such as inhalant allergy and asthma, had a significant relation with the number of vocal symptoms. The voice knowledge among the choir singers seemed limited, although the scores were normally distributed. The understanding of the anatomy in the vocal fold area was limited, since a fifth was of the impression that water goes directly through the vocal folds. The voice knowledge was higher among women, younger participants, and among those who had singing education.

The prevalence of voice disorders among choir singers seems to be similar to the prevalence rate among professional voice users. Choir singers with a vocally demanding profession are at a higher risk of developing a functional voice disorder. Choir singers who suffer from, for example, inhalant allergy, asthma and reflux disease also run a greater risk of developing a voice disorder. The results of this study raise the importance of educating choir singers about the voice, in order to prevent development of voice disorders.



Key words: choir singers, choral singing, prevalence, risk factors, survey, vocal symptoms, voice disorder, voice ergonomics, voice knowledge

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En förutsättning för att kunna sjunga är en fungerande röst. Man kunde tänka sig att sångare skulle ha en god insikt i hur de sköter sin röst på bästa sätt för att förbättra och upprätthålla en god röstkvalitet. Resultat av tidigare studier har visat att sångare lider av mer röstproblem och använder mer negativa beteenden för rösten än icke-sångare. Syftet med den här avhandlingen var att utreda prevalensen av röststörningar hos körsångare och att utreda riskfaktorer för att utveckla en röststörning. Ett annat syfte var att utreda hur stor kunskap finlandssvenska körsångare har om röstens anatomi, fysiologi och röstergonomi.

Materialet för studien samlades in genom en enkät på webben. Länken till enkäten distribuerades till körsångare via två finlandssvenska sångförbund. Några körer utanför dessa förbund kontaktades också. Enkäten var indelad i fyra delar och inkluderade frågor om bakgrundsinformation, röstsymtom, röstvanor och röstkunskap. I studien deltog 315 vuxna körsångare varav 65 % var kvinnor och 35 % var män.

En femtedel (21 %) av körsångarna upplevde två eller flera ofta förekommande röstsymtom, vilket kan definieras som en funktionell röststörning. Inga signifikanta könsskillnader i antal röstsymtom uppmärksammades i den här studien. Det vanligaste, ofta förekommande röstsymtomet var behovet att hosta eller harkla sig, vilket förekom hos 29 % av deltagarna. Av de körsångare som hade ett röstbelastande yrke rapporterade dubbelt fler två eller fler ofta förekommande röstsymtom. Hälsorelaterade riskfaktorer, såsom luftvägsallergi, astma och halsbränna, hade signifikanta samband med antal röstsymtom. Kunskapen om rösten verkade begränsad, även om poängen var normalfördelade. Den anatomiska kunskapen om röstorganet verkade också begränsad, till exempel var en femtedel av den uppfattningen att vatten går rakt ner genom stämbanden. Kunskapen var signifikant högre hos kvinnor, yngre körsångare och hos de med utbildning inom sång.

Förekomsten av röststörningar hos körsångare verkar vara liknande som hos professionella röstanvändare. De körsångare som hade ett röstbelastande yrke hade högre risk att utveckla en röststörning än de som inte hade ett röstbelastande yrke. Förekomst av luftvägsallergi, astma eller reflux ökar också risken för att få en röststörning. Resultaten av den här studien tyder på att körsångare skulle dra nytta av mer utbildning om rösten för att förebygga utvecklandet av röststörningar.



Nyckelord: enkätstudie, förekomst, körsång, körsångare, riskfaktorer, röstergonomi, röstkunskap, röststörning, röstsymtom

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# 1 Introduction

Singing has simply been defined as production of melodic tones with the voice (Vennard, 1967). Voice is produced when air flows from the lungs through the vocal folds and they start to vibrate and form a sound (Stemple, Glaze, & Gerdeman-Klaben, 2000). The sound strengthens and is formed in the mouth by what one wants to say (Stemple et al., 2000). The most important components in voice production are respiration, phonation and resonance (Figure 1) (Doscher, 1994; Stemple et al., 2000; Sundberg, 2001).

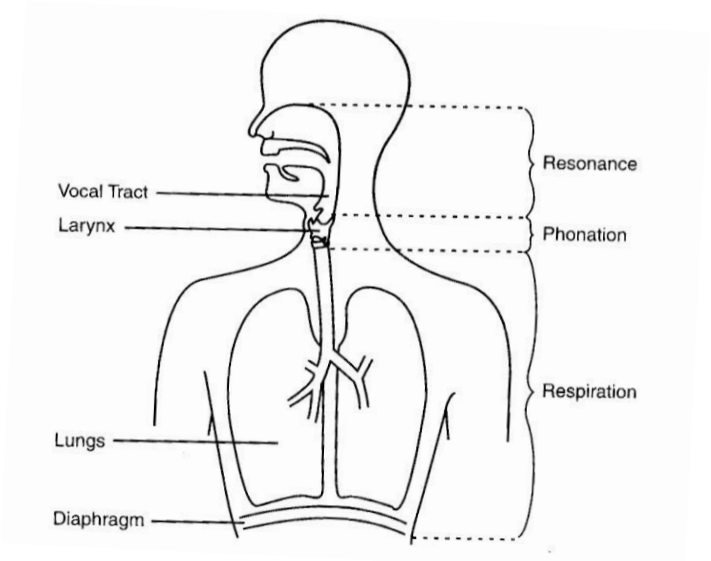


*Figure 1*. The three components of voice production: respiration, phonation and resonance. Retrieved from: *Clinical voice pathology: Theory and Management* (p. 22), by C. J. Stemple, L. E. Glaze, & B. Gerdeman-Klaben, 2000, San Diego: Singular Thomson Learning.

The demands singers place on these three components during singing, are different from the demands placed on them during normal speech, and the demands people from other occupational groups place on their voice, for example in terms of amount of subglottal pressure (Lindblad, 1992; Sundberg, 1990). In normal speech, loudness and pitch are united with a similar demand for subglottal pressure (Sundberg, 1990). In singing, however, the subglottal pressure is unique for each tone depending on the intended loudness and pitch (Lindblad, 1992; Sundberg, 1990).

From a logical point of view one could expect trained singers to receive thorough knowledge of the anatomy, physiology and care of the voice during their studies (Braun-Janzen & Zeine, 2009; Hazlett, Duffy, & Moorhead, 2011). At the same time, the results of several studies show that singers suffer from more voice problems than non-singers (for a review, see Williams, 2003). The vocal mechanism is the most important instrument for choir singers, even though choral singing is often experienced as something greater than just use of voice and vocal training (Sundberg, 1990). To my knowledge, there are no published research data about choir singers' knowledge of the voice in terms of anatomy, physiology and voice ergonomics, or prevalence of voice disorders among choir singers.

### 1.1 Voice Disorder

The concept *voice disorder* has been differently defined in the literature. Stemple, Glaze and Gerdeman-Klaben (2000) use the concept voice disorder for when an individual's voice quality, pitch or volume is different from another individual's, with matching age, gender, cultural background and geographic location. Another study defined a voice problem as whenever the voice does not work or when it sounds divergent (Roy, Merrill, Thibeault, Gray, & Smith, 2004). Vilkman (2004) defined a voice disorder in terms of working capacity, and stated that a voice disorder should be considered when a person's voice cannot meet the demands the occupation places on it. The focus is then at the durability of the voice. In several questionnaire studies, a voice disorder has been defined as when a person has two or more, weekly or more frequently occurring vocal symptoms (Holmqvist, Santtila, Lindström, Sala, & Simberg, 2013; Ohlsson, Andersson, Södersten, Simberg, & Barregård, 2012; Simberg, Sala, Laine, & Rönnemaa, 2001; Simberg, Sala, & Rönnemaa, 2004; Simberg, Santtila, Soveri, Varjonen, Sala, & Sandnabba, 2009; Simberg, Sala, Tuomainen, & Rönnemaa, 2009; Simberg, Sala, Vehmas, & Laine, 2005). In this thesis, the term *voice disorder* is used irrespective of the terms used in the included studies.

There are several factors that increase the risk of developing a voice disorder. These factors seem to include both genetic factors and environmental factors (Simberg et al., 2009). The environmental risk factors, which seem to play the key role, could be

categorized in three groups: health-related risk factors, work-related risk factors and behavior-related risk factors. The health-related factors that have been proposed as risks for developing a voice disorder include inhalant allergy (Jackson-Menaldi, Dzul, & Holland, 1999; Simberg et al., 2009; Spiegel, Sataloff, & Emerich, 1997), asthma and asthma medication (Ihre, Zetterström, Ihre, & Hammarberg, 2004), reflux disease (Koufman, Sataloff, & Toohill, 1996; Ross, Noordzji, & Woo, 1998; Sala, Salminen, Simberg, Koskenvuo, & Ovaska, 2008) and smoking (Byeon, in press; Simberg et al., in press).

Persons in vocally demanding professions are exposed to several work-related risk factors. The primary factor is considered to be the extensive or prolonged voice use (Sala, Laine, Simberg, Pentti, & Suonpää, 2001; Vilkman, 2004). Another risk factor for these persons is their need for a loud voice, which is often a result of high background noise, poor room acoustics, long speaking distance and bad air quality (Vilkman, 2004). The individual factors associated with vocally demanding professions include inadequate working posture, experience of stress, limited use of voice aids, and inadequate treatment of early symptoms such as laryngitis (Vilkman, 2004). Speech habits considered vocally abusive or behavior-related risk factors are, for example, speaking fast, dominating conversations, speaking loudly and speaking in a too low-pitched voice (Sapir, 1993; Sapir, Attias, & Shahar, 1992; Sapir, Keidar, & Mathers-Schmidt, 1993; Sapir, Mathers-Schmidt, & Larson, 1996).

### 1.2 Professional Voice Users

A person who truly depends on the voice at work can be defined as a professional voice user (Stemple et al., 2000). Not only singers come under this category, but also, for example, actors, teachers, pastors, lawyers and sales-men (Stemple et al., 2000). In the United States, these professions account for 25–35 % of the working population (Titze, Lemke, & Montequin, 1997), similar to one fourth that has been estimated in Finland (Vilkman, 2004). The demands professional voice users in different professions place on their voice differ still regarding a few variables (Timmermans, Vanderwegen, & De Bodt, 2005; Vilkman, 2004). The five most differing variables are: the quantity of voice use a day, the demands placed on the vocal quality and on volume, the occurrence of

mental stress and the necessity to travel for work (Timmermans, Vanderwegen, et al., 2005). Persons with vocally demanding professions run a significantly higher risk of developing a voice disorder related to their work (Stemple et al., 2000; Vilkman, 2004). A voice disorder for one of these can furthermore have a significant negative impact on their career (Roy et al., 2004; Stemple et al., 2000; Verdolini & Ramig, 2001).

Choir singers, who could be considered as semi-professional voice users, have not participated in studies to the same extent as professional singers have. Sundberg (1990) raises the question why, and proposes that it reveals the delusion that choir singing would be less glamorous and heroic than solo singing. The tasks of a solo singer differ still from the tasks of a choir singer (Smith & Sataloff, 1984; Ternström, 2003). A solo singer concentrates on being clearly heard, whereas a choir singer focuses on contributing and blending. These are acoustically two different types of voice production and important to separate (Smith & Sataloff, 1984; Ternström, 2003).

In her study, Bell (2004) presented the typical amateur choir singer: a woman over 40 years who is well educated, cultural, plays the piano and is involved in a congregation and in the society. The vocal profile of a choir singer is presented in a study by Timmermans, Vanderwegen et al. (2005). The results showed that 93 % of the 16 choir singers experienced vocal fatigue, and 37 % visit an Ear, Nose & Throat (ENT) doctor in case of voice problems. Allergies were reported by 37 %, 62 % reported prevalence of stress and 31 % experienced voice hoarseness. The conclusion was that choir singers have an adapted lifestyle with less smoking (0 %) and less vocal abuse (6 %) than professional voice users, but yet experience vocal fatigue and hoarseness (Timmermans, Vanderwegen et al., 2005).

### 1.3 Choral Singing

Choral singing seems to have physical as well as emotional, social and spiritual advantages (Clift & Hancox, 2001). The physical advantages include the positive effects on breathing and lung function, posture and body control, relaxation and stress release, and physical activity and energy (Clift & Hancox, 2001; Clift, Hancox, Morrison, Hess, Kreutz, & Stewart, 2009). Published research results indicate that the amount of the antibody Immunoglobulin A (IgA) increases and the level of the stress hormone cortisol

decreases while singing (Beck, Cesario, Yousefi, & Enamoto, 2000; Kreutz et al., 2003; Kreutz, Bongard, Rohrmann, Hodapp, & Grebe, 2004). IgA is believed to be the most important antibody that works against infections in the upper airways (Kreutz et al., 2003).

The emotional effects choral singing have, seem to be irrespective of the amount of singing education or socio-economic status (Bailey & Davidson, 2005), and include feelings of alertness, happiness, pride, cheerfulness and satisfaction (Sandgren, 2009). It has been stated that choral singing also has a strong social function (Durrant, 2005). In Finland and Sweden the social function is experienced to be as important as the musical (Durrant, 2005). Engagement in choral singing is similar to engagement in sports events, where the participants create a goal together, which everyone tries to reach, irrespective of background, social status or ethnicity (Durrant, 2005). Furthermore, singing and choral singing give the possibility to express feelings such as patriotism, religiosity and/or solidarity (Durrant, 2005). These findings support the suggestion that choral singing could have a strong impact on a person's well-being. Kreutz et al. (2003) state that since every human being is capable of developing sufficient vocal qualities to engage in choral singing, active choral singing should be accounted as a risk-free, economical, easily-available and powerful way to improve physical and psychological well-being.

### 1.4 Voice Disorders in Singers

Singers tend to report significantly more vocal symptoms than non-singers (Phyland, Oates, & Greenwood, 1999; Sapir, 1993; Sapir et al., 1996). Prevalence of several vocal symptoms could indicate an underlying voice disorder. The singer students in a study by Sapir (1993) reported prevalence of vocal symptoms such as dryness, hoarseness, vocal fatigue, reduced pitch range and pain in the throat. More than half of the singer students reported three or more of these vocal symptoms. Only 13 % of the singer students were completely without symptoms (Sapir, 1993). Sapir et al. (1996) reported that singers significantly more often experience a feeling of dryness, discomfort or tightness in the throat, than non-singers. Thirty-nine percent of the singers reported three or more vocal symptoms, compared to 10 % of non-singers (Sapir et al., 1996).

A study done among 129 young (aged 3–25) choir singers revealed high prevalence of hoarseness (42.6 %) and voice fatigue (24 %) (Tepe et al., 2002). Singing teachers have been proposed of having almost four times higher risk of developing a voice disorder at some point, compared to similar-age control subjects (Miller & Verdolini, 1995). The singing teachers with current voice problems experienced voice symptoms such as a tired voice (52 %), loss of high notes (37 %), hoarseness (33 %) and effortfulness (33 %) (Miller & Verdolini, 1995). Singers have also reported high points on the Voice Handicap Index (VHI) (Awan & Ensslen, 2010; Timmermans et al., 2002), and a greater use of harmful and non-optimal vocal behaviors than non-singers (Sapir et al., 1996). Students of vocal demanding careers report a more frequent use of vocally harmful behaviors such as smoking (Sapir, 1993; Timmermans et al., 2002).

Singers' tendency to use vocally harmful behaviors could reflect their lack of knowledge about voice anatomy, physiology and voice ergonomics. This theory was supported by the results from a study by Braun-Janzen and Zeine (2009). Braun-Janzen and Zeine (2009) included both professional singers and amateur singers in their questionnaire study, which included questions about the participants' knowledge of vocal anatomy, physiology, hygiene, disorders and the role of the speech-language pathologist (SLP) in voice care. The professional singers were more interested in receiving a greater knowledge of the voice than the amateur singers were. However, neither of the groups had a thorough knowledge about the role of an SLP in voice care, 70 % of the 129 participants answered they had limited or no knowledge in the field. The professional singers scored overall higher on knowledge-based questions, even though "I don't know"-answers were evident among both groups and could indicate lack of knowledge and/or misunderstandings about the voice. Braun-Janzen and Zeine (2009) suggest that singers would benefit from and be receptive for services of an SLP.

### 1.5 Preventive Voice Ergonomic Education

Professional voice users are encouraged to use an ergonomic vocal behavior in order to prevent and decrease the risk of developing a voice disorder (Sala et al., 2001; Vilkman, 2004). To be able to use the voice ergonomically, it presupposes receiving adequate knowledge of the voice, voice disorders and voice ergonomics during the singing

studies (Sapir, 1993). Other experts in the field also advocate more education in voice ergonomics for future professional voice users, with the main focus on preventive vocal hygiene (Hazlett et al., 2011; Phyland et al., 1999; Sapir, 1993; Timmermans et al., 2002; Timmermans, De Bodt, Wuyts, & Heyning, 2005).

Timmermans, Vanderwegen et al. (2005) emphasize that the requested amount of knowledge of voice ergonomics are proportional to the demands the work places on the voice. A few studies have investigated singers and choir singers in terms of education in voice ergonomics and vocal hygiene (Broaddus-Lawrence, Treole, McCabe, Allen, & Toppin, 2000; Tepe et al., 2002; Timmermans, Vanderwegen, et al., 2005). Results from studies suggest that education in voice ergonomics improves vocal behaviors, even though no study to this date has met the demands for a well-designed, controlled study with high evidence (for a review, see Hazlett et al., 2011).

### 1.6 Purpose of the Study

The purposes of this study were to investigate prevalence of voice disorders among choir singers and to discover the risk factors associated with voice disorders. An additional purpose was to explore the choir singers' knowledge about the voice anatomy, physiology and voice ergonomics.

## 2 Method

Before collecting the research data, an ethical consent was retrieved from the ethical committee at the Department of Psychology and Logopedics at Abo Akademi University. Finlands svenska sång- och musikförbund (FSSMF) (eng. Finland's Swedish song and music association, my translation) and Finlands svenska kyrkosångsförbund (FSKSF) (eng. Finland's Swedish church singing association, my translation) were contacted for distribution of the questionnaire. There are 366 active choirs in the Swedish-speaking parts of Finland, and almost all of them are members in FSSMF (Kronqvist, H., 2013). Seventy-nine choirs in congregations in the Swedish-speaking part of Finland are part of FSKSF ("Om förbundet", 2013).

### 2.1 Recruiting Process

A recruiting letter in Swedish (Appendix A) with information about the study and a link to the web-questionnaire was distributed via e-mail by the secretaries of FSSMF and FSKSF to choir directors and/or leaders. The director or leader was asked to forward the questionnaire to the members of their choir. A few personally known choirs, which were not part of any of these associations, were also contacted via e-mail. The recruiting letter described the purposes of the study, participation criteria and participation process. It also stated the participants' voluntariness and anonymity. To encourage choir singers to participate, two books about the voice were raffled among the participants. To guarantee anonymity, the participants were asked to e-mail their name and address after filling out the questionnaire. After a few weeks a reminder was sent out via e-mail to FSSMF and FSKSF (Appendix B). After 1.5 month the questionnaire was closed.

### 2.2 The Questionnaire

The data was collected with a four-part questionnaire (Appendix C), which was answered online. The questionnaire included both open-ended and closed questions, of which some were mandatory and some were not. The questionnaire was divided into four parts: background, vocal symptoms, vocal habits and voice knowledge. The background questions elicited information about the participants' background, such as age, sex, education, health status and years of choral singing. One health-related question elicited information about previously diagnosed voice disorders. The risk factors for developing a voice disorder asked for in the questionnaire, such as inhalant allergy, asthma and smoking were based on previous research. In one question, the participants were asked to rate the importance of singing in their lives, and was retrieved from a study by Sapir et al. (1996).

The vocal symptoms asked for were retrieved from earlier studies where a voice disorder was defined as when a person has two or more weekly or more frequently occurring vocal symptoms (Holmqvist et al., 2013; Ohlsson et al., 2012; Simberg et al., 2001; Simberg et al., 2004; Simberg et al., 2005; Simberg, Sala, et al., 2009; Simberg, Santtila, et al., 2009). The six vocal symptoms were: *throat clearing or coughing*, *voice becomes strained or tires*, *sensation of pain or lump in the throat*, *the voice becomes*

*low or hoarse*, *difficulty in being heard* and *voice breaks when speaking*. The participants were asked to rate the prevalence of the different vocal symptoms as "daily/weekly" or "rarely/not at all" (Holmqvist et al., 2013; Ohlsson et al., 2012; Simberg et al., 2001; Simberg et al., 2004; Simberg et al., 2005; Simberg, Sala, et al., 2009; Simberg, Santtila, et al., 2009).

The two last parts of the questionnaire were aimed to investigate the participants' knowledge about vocal care and voice ergonomics, both through questions about vocal habits and through knowledge-based questions. The participants were asked for example about habits when having phlegm in the throat and when hoarseness occurs. In the knowledge-based questions about voice anatomy, physiology and voice ergonomics, the participants picked one or several answers from a number of options. This part included, for example, questions about the vocal folds, the diaphragm, the importance of breathing and the optimal voice behavior. The maximum score for all knowledge-based questions was 54 points.

All questions in the questionnaire were based on previous research or personal experiences. Before the questionnaire was opened, it was pretested in a group of choir singers, conductors and speech therapists. After the pretest, some of the questions were revised due to uncertainty of meaning.

### 2.3 Statistical Analysis

The data was analyzed in IBM SPSS Statistics for Windows, version 21.0. Parts of the data were decoded and lumped together into new variables and fewer groups. Demographic information and scores of the knowledge-based questions were summarized using descriptive statistics, such as mean and standard deviation. Chi-square tests were used to test for relationships and differences between variables, for example to examine the relationship between the number of vocal symptoms and several risk factors. Independent samples t-tests were used when examining the scoring on the knowledge-based questions and the relationship with several factors, such as gender. The score of the knowledge-based questions was tested for normality with the Kolmogorov-Smirnov normality test.

### 2.4 Participants

Adult (> 18 years old) choir singers in Swedish-speaking parts of Finland participated in the study. At the closing of the questionnaire, 319 answers had been collected. Two answers were excluded because the participant had sent a double of his or her answers. One participant suffered from extensive voice problems due to a disease and one participant seemed to have tired answering towards the end of the questionnaire and left many questions un-answered or consequently answered "don't know". These two participants were also excluded. After the exclusion, the participants were 315. Because of the long-chained distribution process, the response rate could unfortunately not be counted.

The participants' choirs were members either of FSSMF or of FSKSF, or they were contacted personally via e-mail. Of the 315 participants, 65.4 % ($n$ = 206) were women and 34.6 % ($n$ = 109) were men. The participants were 19−82 years old and were divided into three age groups. The majority of the participants were 40−59 years old (39.7 %). One participant did not tell his or her age. See Table 1 for a review of the age groups. The age did not differ significantly between women ($M$ = 52.24, $SD$ = 14.31) and men ($M$ = 53.35, $SD$ = 15.29).

Table 1

*The Participants Divided into Age Groups (N = 314)*

| Age | % | *n* |
|---|---|---|
| 18−39 years | 22.5 | 71 |
| 40−59 years | 39.7 | 125 |
| 60−82 years | 37.5 | 118 |

Sopranos represented the largest part of the participants (35.6 %), although altos (29.5 %), tenors (14.6 %) and bassos (20.3 %) were also represented. Of the participants in this study, 2.5 % ($n$ = 8) classified themselves as professional singers. A few ($n$ = 10) chose the alternative "Other", and described themselves as something between an

amateur singer and a professional singer. With their further description, they were classified as amateur singers. Due to the small number of professional singers, no analyses could be done between professional and amateur singers.

Half (48.6 %, *n* = 153) of the choir singers had no singing education. The participants had been singing in choirs on average 21 years (*SD* = 14.6), with a range from 0 to 60 years. The most common was 10–29 years of choral singing (43.5 %, *n* = 137). The participants were singing in choirs in different parts of Swedish-Finland, the biggest part in choirs in Ostrobothnia (28.9 %, *n* = 91) (Figure 2).

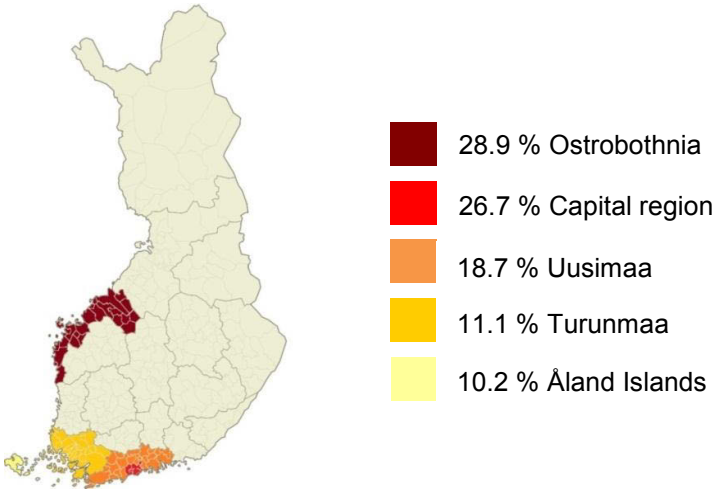


*Figure 2*. The geographic location of the participants and their choirs.

The song genre in the choirs varied from pop (*n* = 15) to gospel (*n* = 33) to church music (*n* = 100), but the most usual was a mixed repertoire (*n* = 232). Most participants were working (59.7 %, *n* = 188), although many participants were retired (27.6 %, *n* = 87). Only 8.3 % (*n* = 26) were students.

## 3 Results

The data collected for this study was broad; hence all results and questions cannot be reviewed in this thesis. The main results are presented in three parts: prevalence of

amateur singer and a professional singer. With their further description, they were classified as amateur singers. Due to the small number of professional singers, no analyses could be done between professional and amateur singers.

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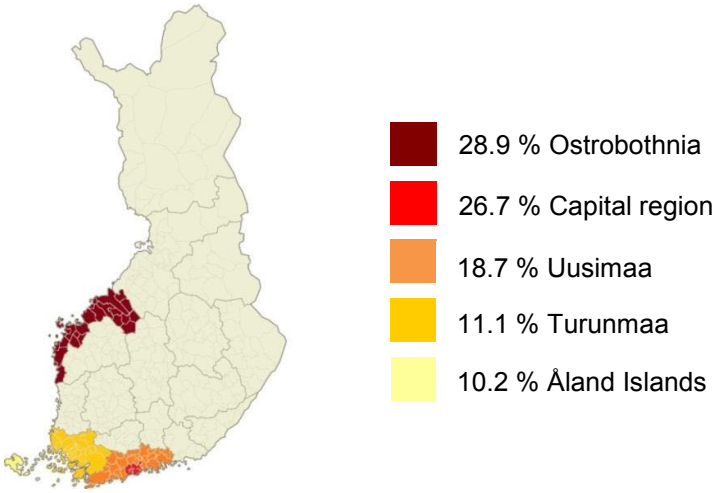


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## 3 Results

The data collected for this study was broad; hence all results and questions cannot be reviewed in this thesis. The main results are presented in three parts: prevalence of

vocal symptoms, presence of risk factors for developing a voice disorder and amount of voice knowledge.

### 3.1 Vocal Symptoms

The most prevalent vocal symptom among choir singers in Swedish-Finland was occurrence of *throat clearing or coughing*, which occurred daily or weekly for more than a fourth of the participants (28.9 %). Common vocal symptoms were *strained or tired voice* (17.5 %), *a sensation of pain or lump in the throat* (13.7 %) and *low or hoarse voice* (12.7 %). Fewer choir singers experienced *difficulty to be heard* (6.3 %) and that *the voice breaks* (5.7 %) (Table 2).

Table 2

*The Prevalence of Vocal Symptoms Among Choir Singers (N = 315)*

| | Daily/weekly | | Rarely/never | |
|---|---|---|---|---|
| Symptom | % | *n* | % | *n* |
| Throat clearing or coughing | 28.9 | 91 | 71.1 | 224 |
| Voice becomes strained or tires | 17.5 | 55 | 82.5 | 260 |
| Sensation of pain or lump in the throat | 13.7 | 43 | 86.3 | 272 |
| The voice becomes low or hoarse | 12.7 | 40 | 87.3 | 275 |
| Difficulty in being heard | 6.3 | 20 | 93.7 | 295 |
| Voice breaks | 5.7 | 18 | 94.3 | 297 |

There was no significant difference between men and women, and prevalence of vocal symptoms occurring daily or weekly. The small gender differences could be of interest in further research, and thereby presented in Table 3. The results are to be interpreted with caution, since the differences were not significant.

Table 3

*Vocal Symptoms Occurring Daily or Weekly − Gender Differences*

| | Men (*n* = 109) | | Women (*n* = 206) | |
|---|---|---|---|---|
| Symptom | *%* | *n* | *%* | *n* |
| Throat clearing or coughing | 33.0 | 36 | 26.7 | 55 |
| Voice becomes strained or tires | 16.5 | 18 | 18.0 | 37 |
| Sensation of pain or lump in the throat | 11.9 | 13 | 14.6 | 30 |
| The voice becomes low or hoarse | 15.6 | 17 | 11.2 | 23 |
| Difficulty in being heard | 3.7 | 4 | 7.8 | 16 |
| Voice breaks | 5.5 | 6 | 5.8 | 12 |

Of the participants, 21 % experienced two or more, weekly or more frequently occurring vocal symptoms (Table 4). In this study, no significant differences between men and women, or age group, were found for the number of vocal symptoms occurring daily or weekly.

Table 4

*Number of Vocal Symptoms Occurring Daily or Weekly for Choir Singers*

| | Men (*n* = 109) | | Women (*n* = 206) | | All (*N* = 315) | |
|---|---|---|---|---|---|---|
| Number of symptoms | % | *n* | % | *n* | % | *n* |
| No symptoms | 52.3 | 57 | 57.3 | 118 | 55.6 | 175 |
| One symptom | 25.7 | 28 | 22.3 | 46 | 23.5 | 74 |
| Two or more symptoms | 22.0 | 24 | 20.4 | 42 | 21.0 | 66 |

Of the choir singers, 5.1 % (*n* = 16) had visited an SLP, a phoniatrician or an ENT-doctor due to voice concerns. Twenty-three participants (7.3 %) reported that they had previously been diagnosed with a voice disorder, such as vocal nodules (*n* = 4), polyps (*n* = 2) and laryngitis (*n* = 4). Of the previously diagnosed, 4.6 % (*n* = 5) were men and 8.8 % (*n* = 18) were women. The difference in prevalence between men and women was not significant. Those who had been diagnosed with a voice disorder reported,

significantly more often, two or more symptoms occurring daily or weekly, $\chi 2(1) = 14.42$, $p = .000$. Of those who had previously been diagnosed with a voice disorder, 52.2 % experienced two or more often occurring vocal symptoms, compared to 18.6 % among those who had not previously been diagnosed.

### 3.2 Risk Factors

The questionnaire also included questions about the choir singers' health, work environment and lifestyle that could affect the risk of developing a voice disorder.

#### 3.2.1 Health-related risk factors

Health-related risk factors asked for in this questionnaire included, for example, prevalence of inhalant allergy, asthma and smoking. Among the choir singers in this study, all risk factors, besides daily smoking, seemed to have a significant relationship with the number of vocal symptoms (Table 5). There were no significant differences between men and women in prevalence of these health-related risk factors.

Table 5

*Relationship Between Health-Related Risk Factors and Vocal Symptoms*

| | No symptoms | | One symptom | | Two or more symptoms | | |
|---|---|---|---|---|---|---|---|
| Health-related risk factor | % | *n* | % | *n* | % | *n* | $\chi 2$ |
| Inhalant allergy (*n* = 60) | 43.3 | 26 | 25.0 | 15 | 31.7 | 19 | $\chi 2(2) = 6.13$, $p = .047$ |
| Voice is often low/hoarse in the morning (*n* = 42) | 19.0 | 8 | 19.0 | 8 | 61.9 | 26 | $\chi 2(2) = 50.82$, $p < .001$ |
| A cold more often than 4 times/year (*n* = 29) | 37.9 | 11 | 24.1 | 7 | 37.9 | 11 | $\chi 2(2) = 6.19$, $p = .045$ |
| Asthma (*n* = 28) | 17.9 | 5 | 21.4 | 6 | 60.7 | 17 | $\chi 2(2) = 31.11$, $p < .001$ |
| Use of asthma medicine (*n* = 26) | 19.2 | 5 | 15.4 | 4 | 65.4 | 17 | $\chi 2(2) = 34.23$, $p < .001$ |
| Have heart burn on average once a week (*n* = 26) | 38.5 | 10 | 19.2 | 5 | 42.3 | 11 | $\chi 2(2) = 7.88$, $p = .019$ |
| Reflux disease (*n* = 13) | 38.5 | 5 | 7.7 | 1 | 53.8 | 7 | $\chi 2(2) = 9.16$, $p = .010$ |
| Daily smoking (*n* = 9) | 22.2 | 2 | 33.3 | 3 | 44.4 | 4 | n. s. |

### 3.2.2 Work-related risk factors

More than half (59.8 %, *n* = 188) of the choir singers were working in different lines of business, and 8.3 % (*n* = 26) were studying. There were significant relations regarding all work-related risk factors asked for in this study and the number of frequently occurring vocal symptoms. No significant gender differences in prevalence of these work-related risk factors were found. Of those who considered themselves having a vocally demanding occupation, 33.9 % reported two or more vocal symptoms occurring daily or weekly. Of those who did not have a vocally demanding occupation, the number was 18.1 %. The difference was significant, $\chi 2(2) = 7.45$, $p = .024$ (Table 6).

Table 6

*Occupation and the Number of Vocal Symptoms Occurring Daily or Weekly (N = 315)*

| | No symptoms | | One symptom | | Two or more symptoms | |
|---|---|---|---|---|---|---|
| Occupation | % | *n* | % | *n* | % | *n* |
| Non-vocally demanding occupation (*n* = 259) | 58.3 | 151 | 23.6 | 61 | 18.1 | 47 |
| Vocally demanding occupation (*n* = 56) | 42.9 | 24 | 23.2 | 13 | 33.9 | 19 |

Twenty-seven choir singers experienced bad air quality at work, among these the number of frequently occurring vocal symptoms seem to be significantly higher than among those not experiencing bad air quality, $\chi 2(2) = 13.73$, $p = .001$ (Table 7). The results regarding working with background noise were similar. Of those choir singers who work with background noise, 34.2 % (*n* = 13) experienced two or more frequently occurring vocal symptoms, compared to 19.1 % (*n* = 53) among those not working with background noise. The difference was significant, $\chi 2(2) = 10.21$, $p = .006$.

Table 7

*Experience of Bad Air Quality at Work and the Number of Vocal Symptoms Occurring Daily or Weekly (N = 315)*

| | No symptom | | One symptom | | Two or more symptoms | |
|---|---|---|---|---|---|---|
| Bad air quality | % | *n* | % | *n* | % | *n* |
| No (*n* = 288) | 58.7 | 169 | 22.2 | 64 | 19.1 | 55 |
| Yes (*n* = 27) | 22.2 | 6 | 37.0 | 10 | 40.7 | 11 |

### 3.2.3 Behavior-related risk factors

Questions about choir singers' use of voice were aimed to investigate how choir singers use their voice. Vocally harmful behaviors asked for in the present study were to be talkative, to speak fast, to dominate conversations, to speak loudly and to speak in a too low-pitched voice. No significant relationships were found between these vocally harmful behaviors and the number of vocal symptoms.

Vocal habits and voice care is to some extent associated with voice knowledge. On the question "What do you do when you have a phlegm in your throat?", 72.4 % (*n* = 228) answered "cough or clear my throat". The more careful vocal behaviors such as "swallow", "drink water" or "cough easily, light" were less used by choir singers. When choir singers have a hoarse voice, they increase their fluid intake (52.4 %, *n* = 165), avoid singing (56.8 %, *n* = 179) and decrease the use of speaking voice (53.0 %, *n* = 167).

## 3.3 Voice Knowledge

The choir singers estimated their voice knowledge level in four different areas: anatomy and physiology, voice ergonomics, SLP's role in voice care and voice disorders. Of the choir singers, 37.1 % (*n* = 117) estimated that they had *limited or no knowledge* about the voice anatomy and physiology, while 55.9 % (*n* = 176) had *basic knowledge* in the field. Similar results were found for estimated voice ergonomic knowledge. Of the choir singers, 68.3 % (*n* = 215) indicated that they had *limited or no knowledge* about the

SLP's role in voice treatment. The results for knowledge about voice disorders were similar.

Most choir singers indicated that they were *moderately interested* in expanding their knowledge about the voice; anatomy and physiology (51.1 %, *n* = 161), voice ergonomics (48.9 %, *n* = 154), SLP's role in voice treatment (45.4 %, *n* = 143) and voice disorders (43.5 %, *n* = 137). Of the choir singers, 38 % had *little or no interest* in receiving more knowledge about the SLP's role in voice treatment and about voice disorders.

The knowledge-based questions in the questionnaire were number 30 to 41. Maximum score for all knowledge-based questions was 54 points. The scores were considered normally distributed, $Z = 0.049$, $p = .069$, with a mean of 30 points and a standard deviation of 7 (Figure 3).

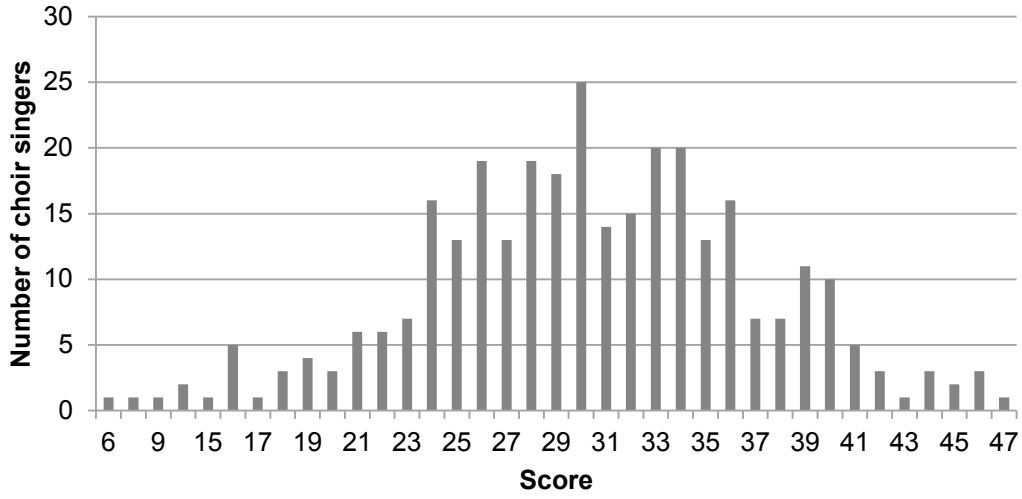


*Figure 3*. The choir singers' scores of the knowledge-based questions.

Over 90 % (92.1 %, *n* = 290) of the choir singers knew that the number of vocal folds are two, not one (suggested by 14, 4.4 %) or four (suggested by 6, 1.9 %). Only 15.6 % (*n* = 49) answered correctly that the vocal folds are/consist of mucous membrane, while 64.4 % (*n* = 203) thought the vocal folds are muscles. A fifth (21.6 %, *n* = 68) were of the impression that water goes directly through the vocal folds. On the question about

what happens primarily on vocal cord level when singing from a higher to a lower tone, 42.2 % ($n$ = 133) answered that the vocal folds vibrate slower and 17.8 % ($n$ = 56) chose the correct answer that they primarily shorten. Use of a 'supported' singing voice is an expression frequently used in choir context, and among the choir singers in this study 63.8 % ($n$ = 201) knew that use of support means controlling exhalation. Some (14.9 %, $n$ = 47) believed it means use of deep breaths, and 10.5 % ($n$ = 33) answered "don't know/unsure". A few also chose the answers "to desperately stretch the stomach muscles" (7.3 %, $n$ = 23) and that use of 'support' means "inhalations and exhalations are equally long" (3.5 %, $n$ = 11).

The knowledge about the risk factors for developing a voice disorder was also investigated. Of the choir singers, 95.2 % ($n$ = 300) answered that smoking is a risk factor, while only 41.3 % ($n$ = 130) answered that coughing could be a risk factor for developing a voice disorder. The "don't know"-answers for the risk factors varied from 3.5 % (for smoking) up to 21.6 % (for strong throat lozenges). Few of the participants (21.9 %, $n$ = 69) considered a vocally demanding occupation combined with choral singing in free time a risk factor, and 64.8 % ($n$ = 204) were of the impression that this is not a risk factor for developing a voice disorder.

The participants had received their knowledge about the voice mostly from choir leaders or directors (63.2 %, $n$ = 199) and singing teachers (22.9 %, $n$ = 72). There was a significant difference between men ($M$ = 28.80, $SD$ = 7.09) and women ($M$ = 31.11, $SD$ = 6.61) for total score; $t(313) = 2.88$, $p = .004$. Years of choral singing had no significant influence on the scoring; however a significant difference in scoring was found for geographic location of the choir. Choir singers in Turunmaa scored highest ($M$ = 32.74, $SD$ = 5.17), and choir singers in Uusimaa scored lowest points ($M$ = 28.76, $SD$ = 7.90). The difference was significant, $t(92) = 2.66$, $p = .004$. Choir singers in the capital region ($M$ = 31.36, $SD$ = 6.84) also scored significantly higher than those in Uusimaa, $t(141) = 2.10$, $p = .038$.

The participants aged 19–39 years scored significantly higher than participants aged 40−59, $t(194) = 2.89$, $p = .004$. The youngest participants also scored significantly higher than participants aged 60–82, $t(187) = 3.63$, $p = .000$. In the same way, students scored significantly higher than retired persons, $t(111) = 2.90$, $p = .005$. Students also

scored significantly higher than persons in the "work: forestry, farm, industry"-group, $t(47) = 2.39$, $p = .021$, and "work: other fields", $t(79) = 2.42$, $p = .018$ (Table 8).

Table 8

*Scores for Participants in Different Work Situations (N = 315)*

| Work situation | *%* | *n* | *M (SD)* |
|---|---|---|---|
| Student | 8.3 | 26 | 33.23 (6.02) |
| Work: educational field | 15.6 | 49 | 31.88 (6.8) |
| Work: service, health care, social sector | 19.4 | 61 | 30.9 (7.43) |
| Unemployed | 4.4 | 14 | 30.14 (7.83) |
| Work: other fields | 17.5 | 55 | 29.75 (6.07) |
| Work: forestry, farm, industry | 7.3 | 23 | 29.61 (4.34) |
| Retired | 27.6 | 87 | 28.7 (7.26) |

Those who had education in singing ($n = 162$) scored higher ($M = 31.75$, $SD = 6.67$) than those who had no singing education ($n = 153$) ($M = 28.78$, $SD = 6.75$). The difference was significant, $t(313) = 3.94$, $p = .000$. Singing education includes private singing lessons, study at workers' institute, music institute, high school and college or university.

Nearly half (49.8 %, $n = 157$) of the choir singers considered singing one of the three most important things in their life. The participants' thoughts about how important singing was in their life were reflected in the total scores they obtained. The more important they rated singing, the more correct answers they obtained (Table 9). The participants were also asked to write a few words about the most important things in choral singing. The most common words used to describe choral singing were community ($n = 138$), joy ($n = 60$) and concord ($n = 43$). Important were also social intercourse ($n = 40$), musical challenges ($n = 36$), voice training and musical development ($n = 32$), and stress release ($n = 25$).

Table 9

*Scores and the Participants' Rating of the Importance of Singing in Their Lives (N = 313)*

| Importance of singing | *%* | *n* | *M (SD)* |
|---|---|---|---|
| The most important | 1.9 | 6 | 32.17 (11.34) |
| One of the 3 most important | 49.8 | 157 | 31.27 (6.51) |
| One of the 5 most important | 32.1 | 101 | 30.09 (6.86) |
| One of the 10 most important | 12.7 | 40 | 27.58 (7.07) |
| Not one of the 10 most important | 2.9 | 9 | 26.22 (5.31) |

# 4 Discussion

Singers have reported significantly more vocal symptoms than non-singers (Phyland et al., 1999; Sapir, 1993; Sapir et al., 1996), and a more frequent use of vocally harmful behaviors (Sapir, 1993; Sapir et al., 1996). The use of good, ergonomic vocal behavior presupposes a thorough knowledge about the voice anatomy and physiology. Choir singers have not been studied to the same extent as solo singers in terms of voice disorders and voice knowledge. The purposes of this study were to investigate the prevalence of voice disorders among choir singers and to discover the risk factors associated with voice disorders. A further purpose was to explore the choir singers' knowledge about voice anatomy, physiology and voice ergonomics. A voice disorder was defined when two or more of the six vocal symptoms occurred weekly or more frequently (Holmqvist et al., 2013; Ohlsson et al., 2012; Simberg et al., 2001; Simberg et al., 2004; Simberg et al., 2005; Simberg, Sala, et al., 2009; Simberg, Santtila, et al., 2009).

## 4.1 Voice Disorders in Choir Singers

A fifth (21 %) of the 315 choir singers who participated in this study had two or more daily or weekly occurring vocal symptoms, which could be defined as a functional voice disorder. Results from studies in which the same vocal symptom questionnaire was used, indicate that the prevalence of voice disorders among choir singers is similar to the prevalence among teacher students (Simberg et al., 2000; Simberg & Sala, 2008)

and teachers (Simberg et al., 2005). The prevalence appears to be higher than among university students (Simberg et al., 2004) and nurses (Sala et al., 2001), but lower than among pre-school teachers (Sala et al., 2001) and priests (Hagelberg & Simberg, in press).

The most common vocal symptom was *throat clearing or coughing*, which occurred daily or weekly for almost a third (28.9 %) of the choir singers. This is consistent with earlier studies, where this vocal symptom has been reported as the most common (Ohlsson et al., 2012; Simberg et al., 2000; Simberg et al., 2001; Simberg et al., 2004; Simberg et al., 2009). *Throat clearing or coughing* was prevalent for half (50.5 %, $n = 46$) of those not defined with a voice disorder, and for half (49.5 %, $n = 45$) of those defined with a voice disorder. Among those who had a voice disorder, the vocal symptoms *throat clearing or coughing* (68.2 %) and *voice becomes strained or tires* (68.2 %) were the most common symptoms occurring daily or weekly. A tired voice has been reported as the most occurring voice symptom among singing teachers, prevalent for 52 % of the singing teachers with current voice problems (Miller & Verdolini, 1995). Vocal fatigue has been reported, similar to the results of this study, by 69.3 % of the professional singers (Phyland et al., 1999). Among 16 choir singers in a previous study, 93 % experienced vocal fatigue (Timmermans, Vanderwegen et al., 2005). Hoarseness has been reported as a common vocal symptom, prevalent for 75.1 % of professional singers (Phyland et al., 1999) and for 31 % of choir singers (Timmermans, Vanderwegen et al., 2005). Among the choir singers in this study, only 12.7 % frequently experienced a hoarse voice. This difference in prevalence rate may be due to different sample sizes and different definitions.

Among the choir singers in this study, there were no significant differences in prevalence of vocal symptoms between men and women. It is well documented that women experience more voice problems and suffer from more voice disorders than men (for a review, see Hunter, Tanner, & Smith, 2011). It could be assumed that men with voice problems were more likely to answer the questionnaire than men without voice concerns, and thereby no gender differences were found. Interestingly, previously diagnosed voice disorders were reported more by female choir singers. Those who reported a previously diagnosed voice disorder also reported significantly more vocal

symptoms, which strengthen the assumption that prevalence of these vocal symptoms indicates an underlying voice disorder.

Age showed no significant relation with the number of vocal symptoms among the choir singers in this study. Age has previously been reported to affect prevalence of voice problems among teachers (Roy et al., 2004; Russell, Oates, & Greenwood, 1998; Smith, Lemke, Taylor, Kirchner, & Hoffman, 1998), and has been seen as a risk factor for voice problems especially for females (Goy, Fernandes, Pichora-Fuller, & van Lieshout, 2013). Among the singing teachers (Miller & Verdolini, 1995), age did not show a significant relation with current voice problems and was explained by generational differences in attitudes towards voice problems and different lifestyles among young and old singers. It is possible that the results among the choir singers in this study also reflect different attitudes toward voice problems and prevalence of vocal symptoms.

It would have been interesting to do a clinical examination of the choir singers' voices, but due to a small budget this could not be done. In a few earlier studies, however, the participants' voices were also clinically examined (Sala et al., 2001; Simberg et al., 2000; Simberg et al., 2001), and the results showed that participants who reported frequently occurring vocal symptoms, also more often had medical findings. This indicates that prevalence of several vocal symptoms could imply an underlying organic voice disorder, also among the choir singers in this study. The frequency alternatives of the vocal symptoms were lumped together as "daily/weekly" and "rarely/not at all". Some of the participants commented that it was difficult to rate the frequency in those categories. In further research, it may be more appropriate to list the four alternatives separately.

### 4.2 Risk Factors for Developing a Voice Disorder

All health-related risk factors explored in this study, except daily smoking, had a significant relationship with the number of vocal symptoms. No gender differences were found regarding the prevalence of the health-related risk factors in this study. Choir singers seem to avoid smoking; among these participants only nine (2.8 %) reported daily smoking, compared to 19 % of men and 13 % of women in Finland (Helldán,

Helakorpi, Virtanen, & Uutela, 2013). The small number of daily smokers in this study is probably the reason why no relationship was found between daily smoking and the number of vocal symptoms.

Inhalant allergy has been proposed as a risk factor for developing a voice disorder (Jackson-Menaldi et al., 1999; Simberg et al., 2009; Spiegel, Sataloff, & Emerich, 1997). Inhalant allergy was the most common health-related risk factor prevalent among 19 % of the choir singers, and was related to the number of vocal symptoms. The prevalence rate of inhalant allergy is consistent with the assumed prevalence rate among Finnish citizens, 20 % (Haahtela, von Hertzen, Mäkelä, & Hannuksela, 2008). The number of vocal symptoms reported by the choir singers who suffer from inhalant allergy is also consistent with findings in the study by Simberg et al. (2009), indicating inhalant allergy as a risk factor for developing a voice disorder for choir singers.

Of the choir singers in this study, 8.9 % reported diagnosed asthma, which associates with the assumed prevalence rate in the adult Finnish population (8−10 %) (Haahtela et al., 2008). Diagnosed asthma had a significant relation to the number of vocal symptoms. Those who had a diagnosed asthma or used asthma medication experienced a higher degree of vocal symptoms, which is consistent with previous reported findings (Ihre et al., 2004). Number of vocal symptoms has also been related to the use of drying medications, such as asthma medication, among singing teachers (Miller & Verdolini, 1995).

Diagnosed reflux disease among these choir singers was reported by 4 %, which is lower than the assumed 10−20 % in the Western world (for a review, see Dent, El-Serag, Wallander, & Johansson, 2005). Dent et al. (2005) defined reflux disease as at least weekly heartburn and/or acid regurgitation. The prevalence of weekly heartburn among the choir singers was twice as high ($n$ = 26) as the prevalence of diagnosed reflux disease ($n$ = 13), and was reported by 8.3 % of the choir singers. This could indicate a higher prevalence of reflux disease, even though still undiagnosed. Both diagnosed reflux disease and weekly heartburn seemed to increase the number of vocal symptoms, suggesting that choir singers with these are at higher risk of developing a voice disorder. A cold more often than four times a year also related significantly to the

number of vocal symptoms. On average, adult Finnish people suffer from colds 2−4 times a year (Jalanko, 1992). The reason for this relationship remains unclear, but it may suggest that frequent colds are harmful for the voice.

According to the results in this study, the work-related risk factors, such as working in an environment containing background noise and bad air quality, seem to be related to the number of frequently occurring vocal symptoms. Choir singers with vocally demanding occupations seem to run a significantly higher risk of developing a voice disorder. These results are in line with the conclusion drawn in the article by Vilkman (2004): "working conditions involving a need for a high speech output level and prolonged voice use have a negative interactive effect on vocal health" (p. 241). Of the choir singers with vocally demanding professions, almost twice as many as the choir singers with non-vocally demanding professions, could be defined with a functional voice disorder. This is similar to the results from a previous study, where voice problems were more frequently reported by teacher students with a voice demanding hobby (Ohlsson et al., 2012). Interestingly, 64.8 % of the choir singers did not consider a vocally demanding occupation combined with choral singing in their free time a risk factor for developing a voice disorder. It would be important to educate the choir singers about the risk factors behind voice disorders, in order to reduce the risk factors and further prevent development of voice disorders.

### 4.3 Voice Knowledge and Preventive Voice Ergonomic Education

Knowledge about one's voice is essential for knowing how to care for it and is closely related to vocal habits and voice use. Professional singers have been reported to have a greater knowledge about the voice, compared to amateur singers (Braun-Janzen & Zeine, 2009). Around half of the choir singers in this study estimated that they had basic knowledge in the field of voice anatomy and physiology, and voice ergonomics. In the study by Braun-Janzen and Zeine (2009), the perceived knowledge level for amateur singers was similar; 49 % indicated basic or thorough understanding about voice anatomy and physiology, and 61 % about care of the vocal mechanism. Two thirds (68.3 %) of the choir singers in this study and 75 % of the amateur singers (Braun-Janzen & Zeine, 2009) indicated that they had limited or no knowledge about voice

disorders and about the SLP's role in voice treatment. Since many choir singers seem to suffer from voice disorders, it would be important to educate choir singers about the disorders and the services an SLP can offer them.

Overall, the choir singers' knowledge about the voice in terms of anatomy, physiology and ergonomics seemed to be limited, although the scores were normally distributed. The choir singers' understanding of the anatomy in the vocal fold area was limited, since a fifth assumed that water goes directly through the vocal folds. Similarly to the results in the study by Braun-Janzen and Zeine (2009), the high number of incorrect and "don't know"-answers suggests that many choir singers lack even basic voice knowledge.

Women scored significantly higher than men, that is, women seem to have a greater knowledge of the voice. The knowledge was also higher among younger choir singers. This could reflect the assumption that young people singing in choirs go in for more professional choral singing than older people. It is assumed that vocal care and vocal health is rated higher in professional choirs, than in choirs with more modest ambitions of competing and performing. This also corresponds with the result that those who rate their singing to be more important also have significantly higher knowledge in the field. Years of choral singing did not influence the scoring, which suggests that the education about the voice in choirs is scarce. Instead, singing education had a significant, positive effect on the knowledge level. Geographic location showed a significant difference in scoring. This finding could be due to some significant age differences between the capital region ($M = 47.5$, $SD = 16.4$) and Uusimaa ($M = 54.6$, $SD = 10.8$), $t(140) = 3.10$, $p = .002$. The scoring differences between the regions were rather small and could also be a coincidence.

It is possible that some of the questions have been interpreted in several ways. Some of the knowledge-based questions, for example question 41 "What is most important when producing a loud voice", had several correct answers and could be interpreted differently. One of the alternatives, "use more air" was chosen by 54.9 % of the participants, and may be interpreted either as having a breathy voice or as taking deeper breaths.

More knowledge about especially voice ergonomics would be important in order to prevent development of a voice disorder. Sixteen (5.1 %) choir singers had previously visited an SLP, phoniatrician or ENT-doctor due to voice concerns. The number is lower than among singing teachers (12 %, Miller & Verdolini, 1995) and among priests (17.9 %, Hagelberg & Simberg, in press). The low number may be due to the fact that choral singing is a hobby and not a profession, and that the choir singers do not consider the vocal symptoms as serious as professional voice users do. The interest level for expanding their knowledge in voice ergonomics varied from little or no interest (16.8 %, $n = 53$), moderately interested (48.9 %, $n = 154$) to very interested (34.3 %, $n = 108$), suggesting that choir singers are concerned about maintaining a healthy voice and could benefit from education in these areas.

The choir singers preferred to receive more education about the voice from experts in the field or their choir director or leader. Some commented that their choir leader was not enough educated to offer more education. Choir leaders or directors have different education, some may be cantors with a university degree and others may be experienced choir singers but without musical education. Many of the choir singers suggested expert visits during choir practices, or separate courses offered by experts, for example, through the workers' institutes.

### 4.4 Conclusion and Suggestions for Further Research

The results of this study indicate that the prevalence of voice disorders among choir singers is 21 %, which is similar to the prevalence rate among professional voice users. The most common vocal symptom among the choir singers was *throat clearing or coughing*, which occurred daily or weekly for almost a third of the choir singers. Choir singers with a vocally demanding profession were almost twice as likely to report several frequently occurring vocal symptoms, which places these choir singers at a significantly higher risk of developing a functional voice disorder. Health-related risk factors, such as inhalant allergy, asthma and reflux disease, had a significant relation to the number of vocal symptoms occurring, suggesting that choir singers with these health issues are exposed to a higher risk of developing voice disorders. Overall, voice knowledge among the choir singers seemed limited, especially concerning voice

disorders and the role of an SLP in voice care. Women and younger participants appeared to have more knowledge of the voice.

The results of this study raise the importance of educating choir singers about the voice. A thorough knowledge about the voice anatomy, physiology, and harmful voice behaviors would be important to reduce the risk factors behind voice disorders, and further prevent development of voice disorders among choir singers. Many positive words were used to describe choral singing, for example community, joy, and concord. These reflects the importance of the social factor in choral singing which make a distinction between solo singing and choral singing also in terms of voice use. The research about choir singers and choral singing is yet limited, and the area is still quite unexplored. In further research, it would be interesting to investigate and evaluate choir leaders' and choir directors' knowledge about the voice. A similar questionnaire could be used with questions regarding both the anatomy and physiology of the voice, as well as voice ergonomics and voice disorders. It could also be interesting to choose a few choirs of different professional level for a perceptual and clinical examination of their voices. A study that investigates the relationship between voice knowledge and voice quality among choir singers could include voice ergonomic education and perceptual analyses of the choir singers' voices. The relationship could be analyzed and compared with a control group, consisting of choir singers that do not receive voice ergonomic education.

Swedish Summary – Svensk sammanfattning

# En enkätstudie om röststörningar och röstkännedom hos körsångare

## Inledning

Sång har enkelt definierats som att producera melodiska toner med rösten (Vennard, 1967). De viktigaste komponenterna i röstproduktion är andning, fonation och resonans (Doscher, 1994; Stemple m.fl., 2000; Sundberg, 2001). De speciella krav som sångare ställer på dessa komponenter skiljer sig betydligt från de krav som många andra yrkesgrupper ställer på vanligt tal (Lindblad, 1992; Sundberg, 1990). Vid vanligt tal är styrka och tonhöjd nära sammankopplade och ställer liknande krav på subglottalt tryck (Sundberg, 1990). Vid sång, däremot, är mängden subglottalt tryck olika för varje ton beroende på önskad tonstyrka och tonhöjd (Lindblad, 1992; Sundberg, 1990).

Resultat av studier tyder på att sångare lider av mer röstproblem och utsätter sina röster för mer skadliga beteenden än icke-sångare (Phyland, Oates, & Greenwood, 1999; Sapir, 1993; Sapir m.fl., 1996). I Phyland med fleras (1999) studie rapporterade 44 % av sångare att de hade haft en eller flera diagnosticerade röststörningar under det senaste året i jämförelse med 21 % av icke-sångare. Sapir med flera (1996) rapporterar i sin studie att sångare signifikant oftare än icke-sångare hade obehagskänslor och känsla av torr och spänd hals. Av sångarna rapporterade 39 % tre eller flera symtom på röststörning, jämfört med 10 % av icke-sångarna (Sapir m.fl., 1996). Enligt Miller och Verdolini (1995) utsätts sånglärare för en nästan fyra gånger större risk för att få en röststörning än den övriga befolkningen (Miller & Verdolini, 1995).

I studier där materialet samlats in med frågeformulär definieras en röststörning som två eller flera ofta återkommande röstsymtom hos en person (Ohlsson m.fl., 2012; Holmqvist m.fl., 2013; Simberg, Santtila m.fl., 2009; Simberg m.fl., 2001; Simberg m.fl., 2004; Simberg, Sala m.fl., 2009; Simberg m.fl., 2005). De sex röstsymtomen som utreds är *rösten blir trött eller ansträngd*, *rösten blir låg eller hes när man talar*, *rösten brister eller sviker när man talar*, *svårigheter att göra rösten hörd*, *behov av att harkla sig eller hosta när man talar* och *känsla av ont i halsen, spändhet eller känsla av ”klump” i halsen*. En person som uppvisar två av dessa symptom varje vecka eller oftare har diagnostiserats med en funktionell röststörning (Sala m.fl., 2001).

Riskfaktorer för att utveckla en röststörning inkluderar både hälsorelaterade, beteenderelaterade och arbetsrelaterade faktorer. De hälsorelaterade faktorer som kan öka risken för att utveckla en röststörning är till exempel luftvägsallergi (Jackson-Menaldi m.fl., 1999; Simberg m.fl., 2009; Spiegel m.fl., 1997), astma och astmamedicinering (Ihre m.fl., 2004), reflux (Kaufman m.fl., 1996; Ross m.fl., 1998; Sala m.fl., 2008) och rökning (Byeon, in press; Simberg m.fl., in press). Negativa röstbeteenden, såsom att tala snabbt, dominera konversationer och tala med stark volym (Sapir, 1993; Sapir m.fl., 1993; Sapir m.fl., 1992; Sapir m.fl., 1996) har föreslagits öka risken för att utveckla en röststörning. Personer som arbetar i röstkrävande yrken blir utsatta för flera riskfaktorer som kan kopplas ihop med deras arbete (Vilkman, 2004). Den främsta riskfaktorn är den ihållande och omfattande röstanvändningen (Sala et al., 2001; Vilkman, 2004) som samtidigt kan påverkas negativt av högt bakgrundsbuller, dålig akustik och dålig luftkvalitet (Vilkman, 2004).

Att sångare utsätter rösten för skadliga beteenden kan eventuellt avspegla brister i deras kunskap om rösten. En tidigare studie (Braun-Janzen & Zeine, 2009) har undersökt professionella och amatörsångares kunskap om rösten. De professionella sångarna hade mer korrekta svar på de kunskapsbaserade frågorna, även om ”jag vet inte” svarades av sångare från båda grupperna och tyder på kunskapsbrist och/eller missuppfattningar i området. Som körsångare är det viktigt att sköta om rösten för att bibehålla en god röstkvalitet, även om körsång ofta upplevs som mycket mer än endast röstträning. Tills vidare har ingen utrett prevalensen av röststörningar hos körsångare eller undersökt körsångares kunskap om röstens anatomi, fysiologi och röstergonomi.

Syftet med den här avhandlingen var att utreda prevalensen av röststörningar hos körsångare, samt att utreda riskfaktorer för att utveckla en röststörning. Ett annat syfte var att utreda hur stor kunskap körsångare har om röstens anatomi, fysiologi och röstergonomi.

**Metod**

Innan materialinsamlingen påbörjades ansöktes om etiskt tillstånd av den etiska nämnden vid Institutionen för psykologi och logopedi vid Åbo Akademi. När tillståndet hade beviljats kontaktades Finlands svenska sång- och musikförbund (FSSMF) och

Finlands svenska kyrkosångsförbund (FSKSF). Ett rekryteringsbrev (Bilaga A) med information om undersökningen och länk till enkäten distribuerades via mejl av sekreterarna på FSSMF och FSKSF till körledare och/eller dirigenter och via dem till körmedlemmar. I rekryteringsbrevet framkom undersökningens syften, vem som kan delta och hur deltagandet går till. Deltagarna fick också information om att deltagandet var frivilligt och anonymt.

Materialet samlades in med hjälp av en webbenkät som bestod av fyra delar: bakgrund, röstsymtom, röstvanor och röstkunskap (Bilaga C). I den första delen samlades information om deltagarnas bakgrund, till exempel ålder, kön, utbildning, hur länge de sjungit i kör, hur viktig körsång var för dem och hurudan röstkunskap de ansåg sig ha. Förekomsten av röstsymtomen valdes genom alternativen ”varje dag/varje vecka” och ”mera sällan/inte alls”. Syftet med de två sista delarna av enkäten var att utreda deltagarnas kunskap om röst, röstanvändning och röstergonomi. Deltagarnas röstkunskap utreddes genom frågor om röstvanor, till exempel vad de brukar göra när de är hesa, och genom faktakunskap. De faktabaserade frågorna om röstens anatomi, fysiologi och röstergonomi inkluderade till exempel frågor om antal stämband, om varför det är bra att dricka vatten under en körövning och om riskfaktorer för att få en röststörning. Alla frågor i enkäten baserade sig på tidigare forskning eller på personliga erfarenheter.

**Resultat**

Det vanligaste röstsymtomet bland deltagarna var *behov av att harkla sig eller hosta när man talar*. Det förekom varje vecka eller oftare hos mer än en fjärdedel av deltagarna (28,9 %). Andra ofta förekommande röstsymtom var: *rösten blir trött eller ansträngd* (17,5 %), *känsla av ont i halsen, spändhet eller känsla av klump i halsen* (13,7 %) och *rösten blir låg eller hes när man talar* (12,7 %). Få körsångare upplevde ofta *svårigheter att göra rösten hörd* (6,3 %) eller *rösten brister eller sviker när man talar* (5,7 %). En femtedel (21 %) av körsångarna hade två eller flera ofta förekommande röstsymtom. Ålder eller kön påverkade inte antal ofta upplevda röstsymtom. Tjugotre körsångare (7,3 %) rapporterade att de tidigare diagnosticerats med en röststörning, till exempel stämbandsknutor ($n$ = 4), stämbandspolyper ($n$ = 2) och laryngit ($n$ = 4). Av de

här körsångarna rapporterade 52,2 % två eller flera ofta förekommande röstsymtom, i jämförelse med 18,6 % hos de som inte tidigare hade blivit diagnosticerade med en röststörning.

Den vanligaste hälsorelaterade riskfaktorn hos körsångarna var luftvägsallergi ($n$ = 60). Luftvägsallergi, astma, användning av astmamedicin, reflux och halsbränna hade signifikanta samband med antal röstsymtom hos körsångarna. Att utsätta rösten för skadliga beteenden verkade inte ha något signifikant samband med antal röstsymtom. Arbetsrelaterade riskfaktorer såsom dålig luftkvalitet och högt bakgrundsbuller hade signifikanta samband med antal röstsymtom. Av de körsångare som hade ett röstbelastande yrke upplevde 33,9 % två eller fler ofta förekommande röstsymtom, jämfört med 18,1 % av dem som inte hade ett röstbelastande yrke. Skillnaden var signifikant.

Körsångarna uppskattade sin kunskap om röstens anatomi och fysiologi, röstergonomi samt talterapeutens roll i röstbehandling. Över hälften (55,9 %) ansåg att de hade *baskunskap* i områdena anatomi, fysiologi och röstergonomi, medan 37,1 % uppskattade kunskapsnivån till *begränsad eller ingen kunskap*. Två tredjedelar av körsångarna (68,3 %) indikerade att de hade *begränsad eller ingen kunskap* om röststörningar och talterapeutens roll i röstbehandling.

Körsångarnas slutgiltiga poäng i de faktabaserade frågorna var normalfördelade mellan körsångarna. Över 90 % av körsångarna visste att människan har två stämband, även om ett stämband (4,4 %) och fyra stämband (1,9 %) föreslogs. Endast 15,6 % visste att stämbanden är eller består av slemhinnor, medan 64,4 % var av den uppfattningen att stämbanden är muskler. Överlag verkade kunskapen om svalget begränsad, eftersom till exempel en femtedel (21,6 %) trodde att vatten går genom stämbanden när man dricker. Användning av ”stödet” är ett vanligt begrepp i körsammanhang, även om endast 63,8 % visste att det innebär att man kontrollerar sin utandning. Få av körsångarna (21,9 %) såg körsång tillsammans med ett röstkrävande yrke som en riskfaktor för att få en röststörning.

Deltagarna i den yngsta åldersgruppen fick signifikant högre poäng på kunskapsfrågorna än deltagarna i de övriga åldersgrupperna. Studerande fick signifikant högre poäng än pensionärerna. Hälften av körsångarna hade någon form av utbildning i

sång och de deltagarna hade signifikant högre poäng i kunskapsfrågorna än de körsångare som inte hade någon utbildning i sång. Ju högre körsångarna skattade betydelsen av sång i deras liv, desto högre poäng fick de i kunskapsfrågorna.

**Diskussion och slutsats**

En femtedel (21 %) av körsångarna upplevde två eller flera ofta förekommande röstsymtom, vilket enligt definitionen i den här studien diagnosticeras som en funktionell röststörning. Prevalensen av röststörning hos körsångare verkar vara liknande som prevalensen hos till exempel lärarstuderande (Simberg m.fl., 2000; Simberg & Sala, 2008) och lärare (Simberg m.fl., 2005). Förekomsten verkar vara högre än hos universitetsstuderande (Simberg m.fl., 2004) och sjukskötare (Sala m.fl., 2001), men något lägre än hos förskolelärare (Sala m.fl., 2001) och präster (Hagelberg & Simberg, i tryck). De som rapporterade att de tidigare diagnosticerats med en röststörning hade signifikant fler röstsymtom, vilket förstärker antagandet om att förekomsten av röstsymtom tyder på en underliggande röststörning.

I den här studien framkom inga skillnader i antal symtom beroende på kön eller ålder. Det är väl dokumenterat att kvinnor har mer röstproblem än män (för en översikt, se Hunter m.fl., 2011). Det går inte att utesluta att män med röstproblem svarade på enkäten i större utsträckning än män utan röstproblem. De hälsorelaterade riskfaktorerna, såsom luftvägsallergi, astma och reflux, hade alla ett signifikant samband med antal röstsymtom, vilket innebär att körsångare som lider av dessa hälsoproblem löper en större risk för att drabbas av en röststörning. Körsångare med röstkrävande yrken verkar ha en dubbelt så hög risk att utveckla en röststörning. Det här är i linje med tidigare forskningsresultat där lärarstuderande med röstkrävande hobbyer, såsom körsång, har rapporterat mer röstproblem (Ohlsson et al., 2012). Av dessa körsångare var, intressant nog, endast en femtedel av den åsikten att ett röstkrävande yrke kombinerat med körsång är en riskfaktor för att utveckla en röststörning. Röstkunskapen hos körsångarna var begränsad, även om poängen för de kunskapsbaserade frågorna var normalfördelade. I likhet med studien av Braun-Janzen och Zeine (2009), kan den höga siffran av felaktiga och ”jag vet inte”-svar tyda på att många körsångare saknar kunskap om rösten.

Resultaten av den här studien lyfter upp betydelsen av att utbilda körsångare om rösten. En god kunskap om hur rösten fungerar och vad den tar skada av skulle vara viktigt för att minska riskfaktorerna bakom röststörningar, och på det sättet förebygga utvecklandet av röststörningar hos körsångare. Körsångarna önskade få mer kunskap om rösten av körledaren eller av andra experter i området. Flera föreslog att man kunde bjuda in föreläsare till körövningarna. Många positiva ord användes för att beskriva körsång, till exempel gemenskap, glädje och harmoni/samklang. De här orden reflekterar betydelsen av körsångens sociala faktor som skiljer solosång och körsång från varandra, också i fråga om röstanvändning. Resultaten i den här studien tyder på att körsångare utsätts för lika stor risk att utveckla röststörningar som professionella röstanvändare, och understryker vikten av mer forskning i området. I fortsatt forskning skulle det vara intressant att utreda körledares kunskap om rösten, till exempel med ett liknande kunskapsbaserat frågeformulär som i den här studien. Det skulle också vara intressant att fokusera på några körer av olika professionell grad och utföra perceptuella och kliniska undersökningar av körsångarnas röster. En studie som undersöker sambandet mellan röstkunskap och röstkvalitet hos körsångare kunde innefatta utbildning om röstergonomi och perceptuella analyser av körsångares röster. Sambandet kunde analyseras och jämföras med en kontrollgrupp som inte får röstergonomisk information.

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Appendix A

The recruiting letter

**Hej du körsångare i Svenskfinland!**

Nu har Du en chans att ge ett **betydelsefullt bidrag till forskningen kring körsång** genom att svara på en kort enkät!

**Delta i utlottningen av två inspirerande böcker om rösten!**

Åbo Akademi

Jag är talterapeutstuderande på Åbo Akademi som planerat inkorporera mitt intresse för musik, sång och speciellt körsång i min Pro Gradu-avhandling. Det huvudsakliga syftet med studien är att utreda hur mycket kunskap körsångare har om rösten. Ett annat syfte är att utreda hur vanligt det är att körsångare i Svenskfinland har röstsymtom. För att kunna göra det behöver jag 200 – 400 finlandssvenska körsångare som kan ta sig några minuter tid att svara på min webbenkät.

Jag behöver svar av både unga och gamla, av både män och kvinnor, med olika utbildning och från hela Svenskfinland, med andra ord **behöver jag just Dig**! Utan Ditt svar går vi miste om viktig kunskap om finlandssvenska körsångares välmående och rösthälsa. Rösten är trots allt det viktigaste verktyget vid körsång!

Att svara på enkäten (se länken nedan) kräver högst 10 minuter av din tid. Dessa minuter ger Dig en inblick i vad som pågår inom körsångsforskningen för tillfället och viktiga insikter om röst och röstanvändning. Samtidigt ger Du ett mycket värdefullt bidrag till forskningen om körsång och körsångare i Svenskfinland!

Deltagandet i studien är frivilligt och helt anonymt. Bland dem som deltar ger jag dessutom möjlighet att delta i utlottningen av två inspirerande, populära böcker om rösten (à 35€):
*Röstergonomi – rösten ett fungerande arbetsredskap (Sala, Sihvo, & Laine, 2012)* och *Röstboken – tal-, röst- och sångövningar (Elliot, 2009)*.

Länk till webbenkäten:
https://survey.abo.fi/lomakkeet/4613/lomake.html

## TACK på förhand för Ditt svar!

Varma hälsningar,

logopedistuderande Sofie Ravall (Sofie.Ravall@abo.fi)
*handledare: Susanna Simberg, professor*

Appendix B

The reminder e-mail

*Ämne:* Bidra till forskningen kring körsång - senast sista februari

Hej igen, körengagerade i Svenskfinland!

Först vill jag från djupet av mitt hjärta tacka alla (nästan 300) som svarat på min enkät! TACK! Tack också för alla uppmuntrande, stöttande kommentarer.

Sedan vill jag påminna de övriga om att det ännu finns möjlighet att svara på enkäten och bidra till forskningen kring körsång. Enkäten stängs den sista februari (28.2) kl. 23:59. Vinnarna i utlottningen av de två böckerna meddelas personligen i mars.

En del har haft svårt att öppna länken i det bifogade brevet, så här kommer adressen: https://survey.abo.fi/lomakkeet/4613/lomake.html

Jag önskar er en fortsatt trevlig vårtermin i er kör!

Varma hälsningar,

logopedistuderande Sofie Ravall

Appendix C

The questionnaire

**Bakgrund**

1. Ålder _____

2. Kön
- □ Kvinna
- □ Man

3. Stämma
- □ Sopran
- □ Alt
- □ Tenor
- □ Bas

4a. Jag är
- □ Studerande
- □ Arbetssökande
- □ Pensionär
- □ Yrkesarbetande: Utbildning, undervisning
- □ Yrkesarbetande: Service
- □ Yrkesarbetande: Hälso- och sjukvård
- □ Yrkesarbetande: Sociala sektorn
- □ Yrkesarbetande: Jord- och skogsbruk, fiske
- □ Yrkesarbetande: Industri
- □ Yrkesarbetande: Annan

*4b. Ifall du valde ”Yrkesarbetande: Annan”, inom vilken bransch arbetar du?*

_____

5a. Din (högsta) utbildning inom sång*

* Kryssa i den grad av utbildning du har angående SÅNG (inte musik)
- □ Ingen
- □ Arbisnivå
- □ Examen från musikinstitut/gymnasium
- □ Kandidatexamen
- □ Magisterexamen
- □ Doktorsexamen
- □ Privata sånglektioner

*5b. Ifall du valde ”Privata sånglektioner”; vem har varit din lärare? (t.ex. kantor, sånglärare)* _____

6. I hur många år har du tagit sånglektioner? _____

7. Din kör finns i*

*Du kan välja ett eller flera alternativ.
- □ Norra Österbotten
- □ Mellersta Österbotten

□ Södra Österbotten
□ Åboland
□ Västra Nyland
□ Östra Nyland
□ Huvudstadsregionen
□ Åland
□ Övriga

8. Körens sånggenre

□ Pop
□ Jazz
□ Klassisk
□ Folkmusik
□ Gospel
□ Rock
□ Musikal
□ Kyrkosång
□ Blandad repertoar

9. Hur många år har du sjungit i kör? _____

10. Hur många timmar i veckan sjunger du?

| | h/vecka |
|---|---|
| Körövning | _____ |
| Sånglektion | _____ |
| Uppträdande | _____ |
| Övar hemma | _____ |
| Övrigt | _____ |

11a. Jag anser mig vara

□ Professionell sångare
□ Amatörsångare
□ Annan

*11b. Ifall du kryssade i Annan: vad?* _____

12a. Har du någon gång blivit diagnosticerad med en röststörning?

□ Nej
□ Ja: stämbandsknutor
□ Ja: stämbandspolyper
□ Ja: annan

*12b. Ifall du kryssade i Ja: annan – vad?* _____

13a. Har du någon gång besökt en talterapeut för

| | Ja | Nej |
|---|---|---|
| Röstterapi | □ | □ |
| Artikulationsterapi | □ | □ |
| Annan orsak | □ | □ |

*13b. Ifall du valde Ja/Annan orsak – för vad?* _____

14a. Av vem har du fått den mest värdefulla kunskapen om röstanvändning?

□ Sånglärare
□ Kördirigent/ledare
□ Talterapeut
□ Genom mina studier
□ Annan

*14b. Ifall du kryssade i Annan – av vem?* _____

15. Hur viktig är sången/körsången i ditt liv?

□ Sången är den VIKTIGASTE saken i mitt liv.
□ Sången är en av de 3 viktigaste sakerna i mitt liv.
□ Sången är en av de 5 viktigaste sakerna i mitt liv.
□ Sången är en av de 10 viktigaste sakerna i mitt liv.
□ Sången är inte en av de 10 viktigaste sakerna i mitt liv.

16. Vilka ord beskriver bäst de delarna av körsång som för dig är de viktigaste?

_____

17. Jag

□ har en eller flera konstaterade luftvägsallergier (t.ex. pollen, hösnuva)
□ har konstaterad astma
□ har blivit diagnosticerad med reflux
□ röker dagligen
□ har besökt en talterapeut/foniater/Öron-näs-hals-läkare p.g.a. min röst
□ är förkyld oftare än 4 ggr/år
□ använder astmamedicin
□ har halsbränna i medeltal en gång/vecka
□ upplever ofta min röst som låg/hes på morgnarna

18. Jag

□ arbetar i ett röstbelastande yrke
□ behöver min röst för att kunna utföra mina arbetsuppgifter
□ har dålig luftkvalitet på min arbetsplats
□ arbetar i bakgrundsbuller/oväsen

19. Jag anser att detta ofta stämmer in på mig:

| | Ja | Nej |
|---|---|---|
| Jag är pratsam | □ | □ |
| Jag talar snabbt | □ | □ |
| Jag talar med hög (stark) röst | □ | □ |
| Jag talar mest i ett samtal (dominerar konversationen) | □ | □ |
| Jag talar i ett lågt tonläge | □ | □ |

20a. Din uppfattade kunskapsnivå

| | Begränsad eller ingen kunskap | Baskunskap | Ingående kunskap |
|---|---|---|---|
| Om röstens anatomi och fysiologi | □ | □ | □ |
| Om hur man ska sköta om rösten (röstergonomi) | □ | □ | □ |
| Om talterapeutens roll vid röstbehandling | □ | □ | □ |
| Om röststörningar | □ | □ | □ |

*20b. Ifall du valde ”baskunskap” eller ”ingående kunskap”; Varifrån har du fått kunskap om detta? (exempelvis av: sånglärare, kantor, körledare, i studierna, eget intresse)*_____

21a. Hur intresserad är du att lära dig mer om

| | Lite eller inte alls intresserad | Någorlunda intresserad | Mycket intresserad |
|---|---|---|---|
| Röstens anatomi och fysiologi | □ | □ | □ |
| Hur man ska sköta om rösten (röstergonomi) | □ | □ | □ |
| Talterapeutens roll vid röstbehandling | □ | □ | □ |
| Röststörningar | □ | □ | □ |

*21b. Ifall du valde ”någorlunda” eller ”mycket” intresserad; av vem/var skulle du vilja lära dig mera? (exempelvis av: sånglärare, talterapeut, kantor, körledare, egna studier)*

_____

22. Eventuella kommentarer till frågorna / klargörande av svar

_____

_____

_____

**Röstsymtom**

23. Hur ofta har du haft följande symptom under det senaste året (välj ett alternativ)

Blir din röst trött eller ansträngd?
□ varje dag/varje vecka
□ mera sällan/inte alls

Blir din röst låg eller hes när du talar?
□ varje dag/varje vecka
□ mera sällan/inte alls

Brister eller sviker rösten när du talar?
□ varje dag/varje vecka
□ mera sällan/inte alls

Har du svårt att göra din röst hörd?
□ varje dag/varje vecka
□ mera sällan/inte alls

Har du ett behov av att harkla dig eller hosta när du talar?
□ varje dag/varje vecka
□ mera sällan/inte alls

Har du ont i halsen, känns halsen spänd eller har du en känsla av att ha en ”klump” i halsen?
□ varje dag/varje vecka
□ mera sällan/inte alls

24. Eventuella kommentarer till frågorna / klargörande av svar

_____

_____

_____

## Röstvanor

25. När du har slem i halsen, brukar du

- □ hosta eller harkla dig
- □ svälja
- □ dricka vatten
- □ hosta lätt, luftigt

26. När du har en hes röst brukar du

- □ öka intaget av vätska
- □ undvika sång helt, eller endast sjunga vid viktiga tillställningar
- □ undvika alkohol
- □ sova med en luftfuktare påslagen
- □ sjunga som vanligt
- □ minska användningen av talrösten
- □ avboka möten eller sammankomster som kräver att du talar
- □ viska vid kommunikation
- □ sova mera
- □ undvika koffein
- □ undvika rökiga omgivningar
- □ undvika att prata i högt bakgrundsbuller
- □ ta kortison ifall du behöver uppträda
- □ ta antihistamin (allergimedicin)

27. Hur många minuter använder du till att värma upp rösten före du ska sjunga?

| | Inte alls | 1−5 | 6−10 | 11−20 | 21−30 | Mer än 30 |
|---|---|---|---|---|---|---|
| Tillsammans med kören | □ | □ | □ | □ | □ | □ |
| Ensam | □ | □ | □ | □ | □ | □ |

28. Körfrågor

1 = Jag är helt av samma åsikt.
2 = Jag är delvis av samma åsikt.
3 = Neutral.
4 = Jag är delvis av motsatt åsikt.
5 = Jag är helt av motsatt åsikt.

| | 1 2 3 4 5 |
|---|---|
| 28a. Min körledare/dirigent inleder alltid körövningen med uppvärmningsövningar | □ □ □ □ □ |
| 28b. Jag känner mig uppvärmd i rösten före fokus övergår till sångrepertoaren | 1 2 3 4 5<br>□ □ □ □ □ |
| 28c. Min röst är ofta trött efter att ha sjungit med kören | 1 2 3 4 5<br>□ □ □ □ □ |
| 28d. Jag sjunger ofta utanför min bekvämlighetszon i kören | 1 2 3 4 5<br>□ □ □ □ □ |
| 28e. Körövningar gör mig fysiskt trött i hela kroppen | 1 2 3 4 5<br>□ □ □ □ □ |
| 28f. Jag blir ofta tillsagd att sjunga starkare än vad jag normalt gör i kören | 1 2 3 4 5<br>□ □ □ □ □ |
| 28g. Körsång är avslappnande och hjälper mig hantera stress | 1 2 3 4 5<br>□ □ □ □ □ |

| | 1 2 3 4 5 |
|---|---|
| 28h. Jag känner ofta att jag behöver bära min stämma i kören | □ □ □ □ □ |
| 28i. Kören påverkar min livskvalitet positivt | 1 2 3 4 5<br>□ □ □ □ □ |
| 28j. Att sjunga en rak ton (istället för vibrato) i kör är tröttsamt för min röst | 1 2 3 4 5<br>□ □ □ □ □ |
| 28k. För att smälta in bättre sjunger jag ofta svagare i kören än vad jag normalt skulle göra | 1 2 3 4 5<br>□ □ □ □ □ |

29. Eventuella kommentarer till frågorna / klargörande av svar

_____

_____

_____

**Kunskap**

30. Stämbanden är/består av

□ slemhinnor
□ muskler
□ brosk
□ vet ej/osäker

31. En människa har

□ ett stämband
□ två stämband
□ tre stämband
□ fyra stämband
□ fem stämband

32. Vad tror du händer primärt på stämbandsnivå när man sjunger från en högre till en lägre ton?

□ Stämbanden blir bredare
□ Stämbanden vibrerar långsammare
□ Stämbanden blir kortare
□ Springan mellan stämbanden öppnas mera

33. Under en 1,5 h-konsert har en kvinnas stämband vibrerat

□ 100-200 ggr
□ 1000-2000 ggr
□ 10 000-20 000 ggr
□ 100 000-200 000 ggr
□ Kring 1 miljon ggr
□ Vet inte/osäker

34. Sant eller falskt

| | Vet inte | Sant | Falskt |
|---|---|---|---|
| 1. Överdriven röstanvändning kan leda till stämbandsknutor. | □ | □ | □ |
| 2. Den primära inandningsmuskeln är diafragman (mellangärdet). | □ | □ | □ |
| 3. I sång är det viktigt att inandningen och utandningen är lika långa. | □ | □ | □ |
| 4. Luftfuktigheten är optimal ifall den är 20 %. | □ | □ | □ |
| 5. Stämbanden är öppna vid sång och slutna vid andning. | □ | □ | □ |

6. Det är skadligt för rösten att tala med laryngit/struphuvudsinflammation. □ □ □
7. Det är bra för rösten att viska. □ □ □
8. Det är skadligt för rösten att hosta. □ □ □
9. Kvinnors stämband vibrerar långsammare än mäns. □ □ □
10. Till begreppet röststörning hör också artikulationsstörning, t.ex. avvikande uttal av R-ljudet □ □ □
11. Stämbanden är den viktigaste muskeln vid röstbildning. □ □ □
12. Röstvila innebär att viska istället för att tala. □ □ □
13. Om man talar mycket och med hög/stark röst kan man få stämbandsknutor. □ □ □
14. Hos foniatern är det möjligt att se stämbanden på en människa i vaket tillstånd. □ □ □
15. Luftstrupen ligger bakom matstrupen. □ □ □
16. Vid frisk röstproduktion rörs mjuka gommen inte alls. □ □ □
17. Det subglottala trycket regleras främst av muskeln trakea. □ □ □
18. Epiglottis är ett livsviktigt brosk. □ □ □
19. Altens stämband vibrerar överlag långsammare än sopranens. □ □ □

## 35. Att använda stödet innebär

□ att krampaktigt spänna magmusklerna
□ att använda ordentliga inandningar
□ att in- och utandningen är lika långa
□ att kontrollera utandningen
□ vet inte/osäker

## 36. Att dricka vatten under en körövning är bra, därför att

□ vattnet går direkt genom de torra stämbanden och fuktar dem
□ struphuvudet sänks när man sväljer
□ för att det känns bättre
□ så att slemhinnan på stämbanden inte blir torr utan hålls smidig
□ vet inte/osäker

## 37. Vilka av dessa är, enligt dig, riskfaktorer för att få en röststörning?

| | Ja | Nej | Vet inte |
|---|---|---|---|
| 1. att prata med laryngit/struphuvudsinflammation | □ | □ | □ |
| 2. att röka | □ | □ | □ |
| 3. att hosta | □ | □ | □ |
| 4. att humma | □ | □ | □ |
| 5. starka halspastiller | □ | □ | □ |
| 6. att viska | □ | □ | □ |
| 7. att prata i buller | □ | □ | □ |
| 8. att gäspa | □ | □ | □ |
| 9. att både ha ett röstkrävande yrke och sjunga i kör på fritiden | □ | □ | □ |
| 10. att andas genom näsan | □ | □ | □ |

## 38. När man använder stödet vid utandning

□ går mellangärdet (diafragman) uppåt
□ går mellangärdet (diafragman) neråt
□ går magen utåt
□ vet inte/osäker

39. En talterapeut arbetar med
- □ artikulation
- □ röst
- □ sväljning
- □ alternativ kommunikation
- □ stamning

40. Vilka av dessa påverkar rösten och röstproduktionen?
- □ Hållning
- □ Andning
- □ Sinnesstämning
- □ Kön
- □ Stress
- □ Spänningar i käkmusklerna
- □ Nervositet
- □ Rökning
- □ Luftfuktighet

41. Det viktigaste när man ska producera en starkare/högre röst är att
- □ höja tonläget
- □ lyfta hakan
- □ öka det subglottala trycket
- □ spänna stämbanden mer än normalt
- □ sänka tonläget, ”tala lågt”
- □ använda mer luft
- □ tala/sjunga långsammare
- □ öka längden på stämbanden

42. Eventuella kommentarer till frågorna / klargörande av svar

_____
_____
_____

Tack så mycket för dina svar!

Pressmeddelande 17.4.2015

# Körsångare i Svenskfinland har röstproblem

Resultaten av en färsk pro gradu-avhandling i Logopedi på Åbo Akademi tyder på att en femtedel av körsångarna i Svenskfinland har en röststörning. Över 300 körsångare deltog i undersökningen genom att svara på en webbenkät. Enkäten bestod dels av frågor om bakgrund och eventuella symptom på röststörning, och dels förekomst av riskfaktorer och kunskap om rösten.

– Var femte körsångare i Svenskfinland har en röststörning som kunde behandlas. Symptom på en röststörning är till exempel heshet, behov av att harkla sig eller hosta medan man talar, och ansträngd eller trött röst, säger Sofie Ravall som har utfört undersökningen. Om man upplever symtomen varje vecka eller oftare, och om det stör arbetet eller körsjungandet, är det dags att söka hjälp.

Körsångare som har ett röstkrävande arbete, så som lärare, advokater, politiker eller anställda i servicebranschen, verkar utsättas för en större risk för att utveckla en röststörning. Förekomsten av allergier, astma eller reflux ökar också risken.
– De körsångare som rapporterade att de behöver rösten i sitt arbete, hade dubbelt så stor benägenhet att uppvisa symptom på en röststörning, säger Ravall.

Att sköta om sin röst är viktigt för de flesta, men speciellt viktigt för sångare för att kunna upprätthålla en god röstkvalitet. För att veta hur man bäst tar hand om sin röst behövs grundläggande kunskap om hur rösten fungerar.
– Över 90 % av körsångarna visste att vi har två stämband, även om några föreslog att vi har ett eller fyra stämband. Däremot var det väldigt få, endast 15 %, som visste att stämbanden är slemhinnor, inte muskler.

Enligt Ravall kunde röstproblemen preventivt åtgärdas genom mer information om rösthälsa och röstergonomi.
– Om man vet hur rösten fungerar och vad rösten tar skada av är det lättare att undvika de beteenden och situationer som kan påverka rösten negativt, och på det sättet förebygga röstproblem. Körsångarnas intresse för mer kunskap om rösten var relativt stort och många önskade att föreläsare skulle besöka körövningen för att informera om rösthälsa och röstergonomi.

Ravall, som snart kan börja kalla sig talterapeut, vill uppmana körsångare att ta kontakt med till exempel en talterapeut ifall de har röstproblem.
– Behandlar man röstproblemen i ett tidigt skede kan man undvika att problemen blir kroniska. Till talterapeuten kommer inte bara barn med svårigheter att uttala vissa språkljud, utan också vuxna med svårigheter i kommunikation, sväljning och röst, påpekar Ravall.

SLP's role in voice treatment. The results for knowledge about voice disorders were similar.

Most choir singers indicated that they were *moderately interested* in expanding their knowledge about the voice; anatomy and physiology (51.1 %, *n* = 161), voice ergonomics (48.9 %, *n* = 154), SLP's role in voice treatment (45.4 %, *n* = 143) and voice disorders (43.5 %, *n* = 137). Of the choir singers, 38 % had *little or no interest* in receiving more knowledge about the SLP's role in voice treatment and about voice disorders.

The knowledge-based questions in the questionnaire were number 30 to 41. Maximum score for all knowledge-based questions was 54 points. The scores were considered normally distributed, $Z = 0.049$, $p = .069$, with a mean of 30 points and a standard deviation of 7 (Figure 3).

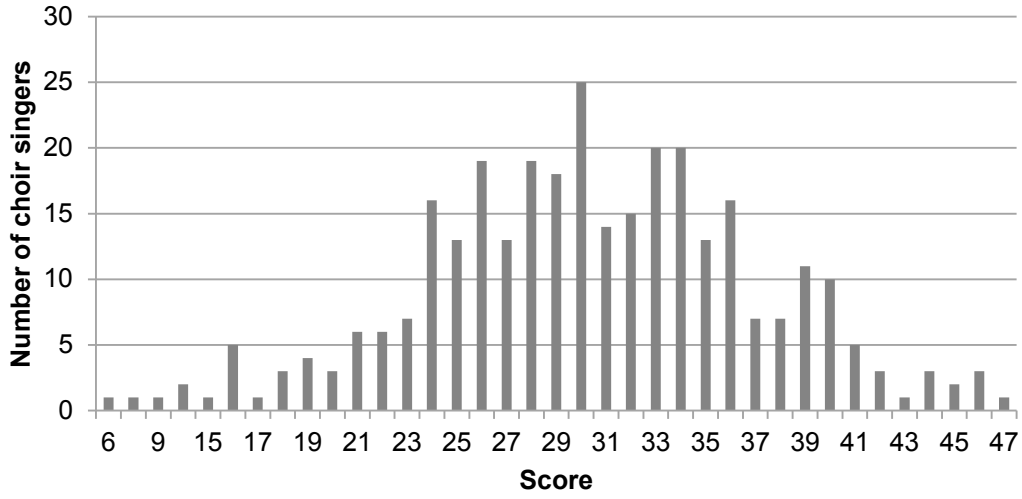


*Figure 3*. The choir singers' scores of the knowledge-based questions.

Over 90 % (92.1 %, *n* = 290) of the choir singers knew that the number of vocal folds are two, not one (suggested by 14, 4.4 %) or four (suggested by 6, 1.9 %). Only 15.6 % (*n* = 49) answered correctly that the vocal folds are/consist of mucous membrane, while 64.4 % (*n* = 203) thought the vocal folds are muscles. A fifth (21.6 %, *n* = 68) were of the impression that water goes directly through the vocal folds. On the question about